Please provide the following information, and submit to the NOAA DM Plan Repository.

Reference to Master DM Plan (if applicable)

As stated in Section IV, Requirement 1.3, DM Plans may be hierarchical. If this DM Plan inherits provisions from a higher-level DM Plan already submitted to the Repository, then this more-specific Plan only needs to provide information that differs from what was provided in the Master DM Plan.

URL of higher-level DM Plan (if any) as submitted to DM Plan Repository:

1. General Description of Data to be Managed

1.1. Name of the Data, data collection Project, or data-producing Program:
Monk Seal Ecosystem Model Data: A Comparison of Ecosystem Structure and Energy Flows of Monk Seal Populations from Laysan Island and French Frigate Shoals in the Northwestern Hawaiian Islands

1.2. Summary description of the data:
To understand various ecosystem dynamics that could explain observed changes and differences in monk seal biomass at French Frigate Shoals (FFS) and Laysan (LAY), Ecopath with Ecosim (EwE) version 6.4.4 modeling software was used to conduct two types of simulations, sensitivity (to understand the system) and hindcast (to evaluate drivers of monk seal population dynamics). EwE models for LAY and FFS were developed and model output was compared between the 2 models. The model output data included in the data sets represent the most important conclusions as reported in the publication from this study. These are (1) the mean of the last 5 years of each perturbation for sensitivity assessment; and (2) hindcast simulations. The first data set was used to understand the main drivers of the trophic structure and energy flow in the ecosystems. Four perturbation scenarios were simulated for a time span of 40 years (2010 through 2049): (a) baseline (compare static structural ecosystem composition between FFS and LAY), (b) altered predator abundance (30% decrease in biomass of main predators in the ecosystem), (c) altered monk seal prey abundance (30% decrease in biomass of main monk seal prey groups, with and without bottomfish to test how much bottomfish accounts for changes, and (d) altered primary productivity (change productivity annually by 10% for both phytoplankton and benthic algae through an annual forcing factor of 0.9 and 1.1 on both groups). The hindcast simulations were performed to evaluate the importance of historical stressors to monk seal population dynamics by selecting the best-fit model for the monk seal biomass time series (1998-2015). Stressors included were (a) fishing with time series based on commercial fishery data, (b) environment with time series of the monthly PDO index as a multiplier for primary productivity, (c) additional mortality simulated with a constant removal of monk seals of varied intensities, and (4) combinations of these 3 stressors (2a and 2c being the most important with regard to the observed trend in monk seal population). Time series observation data of monk seal biomass and benthic bottomfish biomass, as

well as catch time series of bank sharks (only for FFS), benthic and demersal bottomfish, bank jacks, and macroheterotrophs (lobsters) were loaded into Ecosim for model fitting. Refer to Weijerman et al (2017) for complete details.

1.3. Is this a one-time data collection, or an ongoing series of measurements?
One-time data collection

1.4. Actual or planned temporal coverage of the data:
1998-01-01 to 2015-12-31

1.5. Actual or planned geographic coverage of the data:
W: -172, E: -166, N: 26, S: 23.5
Laysan and French Frigate Shoals of the Northwestern Hawaiian Islands.

1.6. Type(s) of data:
(e.g., digital numeric data, imagery, photographs, video, audio, database, tabular data, etc.)
Table (digital)

1.7. Data collection method(s):
(e.g., satellite, airplane, unmanned aerial system, radar, weather station, moored buoy, research vessel, autonomous underwater vehicle, animal tagging, manual surveys, enforcement activities, numerical model, etc.)
Instrument: Not Applicable
Platform: Not Applicable
Physical Collection / Fishing Gear: Not Applicable

1.8. If data are from a NOAA Observing System of Record, indicate name of system:

1.8.1. If data are from another observing system, please specify:

2. Point of Contact for this Data Management Plan (author or maintainer)

2.1. Name:
Annette M DesRochers

2.2. Title:
Metadata Contact

2.3. Affiliation or facility:

2.4. E-mail address:
annette.desrochers@noaa.gov

2.5. Phone number:
(808)725-5461

3. Responsible Party for Data Management
Program Managers, or their designee, shall be responsible for assuring the proper management of the data produced by their Program. Please indicate the responsible party below.

3.1. Name:
Mariska Weijerman

3.2. Title:
Data Steward

4. Resources
Programs must identify resources within their own budget for managing the data they produce.

4.1. Have resources for management of these data been identified?
Yes

4.2. Approximate percentage of the budget for these data devoted to data management (specify percentage or "unknown"):
Unknown

5. Data Lineage and Quality
NOAA has issued Information Quality Guidelines for ensuring and maximizing the quality, objectivity, utility, and integrity of information which it disseminates.

5.1. Processing workflow of the data from collection or acquisition to making it publicly accessible
(describe or provide URL of description):
Lineage Statement:
Input data was collected for the Ecopath with Ecosim model (EwE) from Parrish et al 2011; PIFSC Ecosystem Sciences Division data, monk seal data, bottomfish stock asessment data, and other sources defined in Weijerman et al 2017 MEPS. The model output data is generated with the EwE model. See Weijerman et al 2017 MEPS for details.

Process Steps:
- Fish species were aggregated into functional groups. All biomass data was converted to metric tons per square kilometer and used as input data for the EwE model. Rate parameters were calculated based on a weighted average by species composition in the functional groups. Landings data of bottomfish were aggregated by year for the spatial areas encompassing the two ecosystems of interest (Laysan and French Frigate Shoals). Model output data is reported without any additional process steps. (Citation: Weijerman M, Robinson S, Parrish F, Polovina J, Littnan C (2017) Comparative application of trophic ecosystem models to evaluate drivers of endangered Hawaiian monk seal populations. Mar Ecol Prog Ser 582:215-229.)

5.1.1. If data at different stages of the workflow, or products derived from these data, are subject to a separate data management plan, provide reference to other plan:

5.2. Quality control procedures employed (describe or provide URL of description):
Model dynamics were validated with a hindcast simulation (1998-2015). Time series data of monk seal biomass and bottomfish biomass were loaded into Ecosim for validation and to fine-tune the model by adjusting vulnerability values and so minimize the residuals between predicted and observed time series of monk seal and bottomfish biomass using a least-square fitting criterion. We manually adjusted vulnerability values of interest based on the results from the perturbation scenarios and restricted them to ecological meaningful values (i.e., preferably between 1 and 3 with 10 as maximum value).

6. Data Documentation
The EDMC Data Documentation Procedural Directive requires that NOAA data be well documented, specifies the use of ISO 19115 and related standards for documentation of new data, and provides links to resources and tools for metadata creation and validation.

6.1. Does metadata comply with EDMC Data Documentation directive?
Yes

6.1.1. If metadata are non-existent or non-compliant, please explain:

6.2. Name of organization or facility providing metadata hosting:
NMFS Office of Science and Technology

6.2.1. If service is needed for metadata hosting, please indicate:

6.3. URL of metadata folder or data catalog, if known:
https://www.fisheries.noaa.gov/inport/item/35796

6.4. Process for producing and maintaining metadata
(describe or provide URL of description):
Metadata produced and maintained in accordance with the NOAA Data Documentation Procedural Directive: https://nosc.noaa.gov/EDMC/DAARWG/docs/EDMC_PD-Data_Documentation_v1.pdf

7. Data Access
NAO 212-15 states that access to environmental data may only be restricted when distribution is explicitly limited by law, regulation, policy (such as those applicable to personally identifiable information or protected critical infrastructure information or proprietary trade information) or by security requirements. The EDMC Data Access Procedural Directive contains specific guidance, recommends the use of open-standard, interoperable, non-proprietary web services, provides information about resources and tools to enable data access, and includes a Waiver to be submitted to justify any approach other than full, unrestricted public access.

7.1. Do these data comply with the Data Access directive?

Yes

7.1.1. If the data are not to be made available to the public at all, or with limitations, has a Waiver (Appendix A of Data Access directive) been filed?

7.1.2. If there are limitations to public data access, describe how data are protected from unauthorized access or disclosure:

7.2. Name of organization of facility providing data access:
National Centers for Environmental Information - Silver Spring, Maryland (NCEI-MD)

7.2.1. If data hosting service is needed, please indicate:

7.2.2. URL of data access service, if known:
> http://accession.nodc.noaa.gov/0190881
> http://accession.nodc.noaa.gov/0190881
> http://accession.nodc.noaa.gov/0190881
> http://accession.nodc.noaa.gov/0190881
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> http://accession.nodc.noaa.gov/0190881
> http://accession.nodc.noaa.gov/0190881

7.3. Data access methods or services offered:
Data can be accessed online via the NOAA National Centers for Environmental Information (NCEI) Ocean Archive.

7.4. Approximate delay between data collection and dissemination:
Unknown

7.4.1. If delay is longer than latency of automated processing, indicate under what authority data access is delayed:

8. Data Preservation and Protection
The NOAA Procedure for Scientific Records Appraisal and Archive Approval describes how to identify, appraise and decide what scientific records are to be preserved in a NOAA archive.

8.1. Actual or planned long-term data archive location:
(Specify NCEI-MD, NCEI-CO, NCEI-NC, NCEI-MS, World Data Center (WDC) facility, Other, To Be Determined, Unable to Archive, or No Archiving Intended)
NCEI-MD

8.1.1. If World Data Center or Other, specify:

8.1.2. If To Be Determined, Unable to Archive or No Archiving Intended, explain:

8.2. Data storage facility prior to being sent to an archive facility (if any):
Pacific Islands Fisheries Science Center - Honolulu, HI

8.3. Approximate delay between data collection and submission to an archive facility:
Unknown

8.4. How will the data be protected from accidental or malicious modification or deletion prior to receipt by the archive?
Discuss data back-up, disaster recovery/contingency planning, and off-site data storage relevant to the data collection
Model data is stored on an external hard drive and backed up to a server at PIFSC weekly by the data steward. Data on the PIFSC server are managed by NOAA IRC and NOAA Fisheries ITS.

9. Additional Line Office or Staff Office Questions
Line and Staff Offices may extend this template by inserting additional questions in this section.